UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,696	11/16/2004	Dongmei Zhang	042933/373987	4310

826 7590 05/13/2010
ALSTON & BIRD LLP
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

EXAMINER	
SMARTH, GERALD A	

ART UNIT	PAPER NUMBER
2446	

MAIL DATE	DELIVERY MODE
05/13/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/510,696	**Applicant(s)** ZHANG ET AL.	
	Examiner GERALD SMARTH	**Art Unit** 2446	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _27 January 2010_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-43_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-43_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _08 October 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _02/03/10_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. It is hereby acknowledged that 10510696 the following papers have been received and placed of record in the file: Remark date 01/27/10.

2. Claims 1-43 are presented for examination. Claims 1, 18, and 35 are independent claims. The remaining claims are dependent on claims 1, 18, and 35. All claims are being amended.

3. The Rejections are respectfully maintained and reproduced infra for application's convenience.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 13, 18-20, 23-25, 30, 32 , 35, 36, 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Park (5912878),

Regarding claim 1, Park teaches a method comprising:

maintaining a congestion control,**(Park discloses the transport layer 46 of the mobile end station invokes a congestion control and recovery process when packets are lost for any reason; Column 4 lines 32-34)** the congestion control variably defining an allowable number of packets which can be sent in a packet- based communication between a first network element and a second network element **(Park discloses multiplicative decrease congestion avoidance, upon loss of a segment, reduces the congestion queue 50 by half from a default size (down to a minimum of at least one segment). For those segments that remain in the allowed queue 50, the re-transmitter 54 is backed off exponentially; Column 4 lines 38-41)** before receipt of acknowledgment messages for sent .packets, wherein said allowable number of packets is reduced in case of packet loss during transmission;. **(Park discloses each time the mobile end station 20 receives an ACK from the MDIS 30, the transport layer 46 of the mobile end station increments the queue size until the queue size reaches half the maximum limit; Column 4 lines 43-47)**

receiving a message indicating a handover of the first network element; **(Park discloses the hand-off manager informs the congestion controller 48 that the delay/loss of packets was due to a mobile-specific event (e.g., hand-off); Column 5 lines 67-column 6 line 4)** and changing, in response to the message, the congestion control to provide faster recovery rate of said allowable number after handover as compared to the recovery rate of said allowable number after a packet loss not caused by handover conditions, wherein said allowable number was reduced due to the

handover. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 2, Park taught the method according to claim 1, as described above. Park further teaches wherein:

maintaining the congestion control comprises maintaining a congestion window of variable size, the size of the congestion window defining said allowable number of packets which can be sent before receipt of acknowledgment messages for the sent packets, **(Park discloses multiplicative decrease congestion avoidance, upon loss of a segment, reduces the congestion queue 50 by half from a default size (down to a minimum of at least one segment). For those segments that remain in the allowed queue 50, the re-transmitter 54 is backed off exponentially; Column 4 lines 38-41)** and the size being controlled dependant on the number of sent packets for which no acknowledgment messages have been received so that the window size is reduced in case of packet loss during transmission;**(Column 4 lines 38-41)**. and

changing the congestion control comprises changing the congestion window size control to provide faster recovery rate of the window size after handover as compared to the recovery rate of the window size after packet loss. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and**

recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)

Regarding claim 3, Park taught the method according to claim 1, as described above. Park further teaches wherein maintaining said congestion control comprises maintaining said congestion control at the second network element. **(Park discloses the hand-off manager informs the congestion controller 48 that the delay/loss of packets was due to a mobile-specific event (e.g., hand-off); Column 5 lines 67-column 6 line 4)**

Regarding claim 13, Park taught the method according to claim 1, as described above. Park further teaches wherein the second network element comprises a correspondent node. **(Park discloses similarly, a mobile end station 20 can roam from the range of a first MDIS 30 to the range of a second MDIS 32; Column 3 lines 31-34)**

Regarding claim 18, Park teaches a system comprising: for managing a first network element; and a second network element; wherein the first network element is configured to:

engage in a packet-based communication with the second network element; **(Parker discloses routers or gateways use tables to forward packets from one end station to the next towards the packet's final destination. A mobile end station 20 moves through the plurality of cells 12, 14, 16 and 18 and**

communicates with a fixed end station 40 via the Internet 38; Column 3 lines 24-28)

cause transmission of acknowledgement messages to the second network element to acknowledge receipt of packets sent by the second network element in the packet-based communication; **(Park discloses each time the mobile end station 20 receives an ACK from the MDIS 30, the transport layer 46 of the mobile end station increments the queue size until the queue size reaches half the maximum limit; Column 4 lines 43-47)**

direct transmission of a message indicating a handover of the first network element in response to performance of a handover by the first network element; and wherein the second network element is configured to: **(Park discloses the TCP invokes the congestion control and recovery process causing long pauses in communication between the mobile end station 20 and fixed end station 40 during and after a cellular hand-off; Column 4 lines 49-55)**

maintain a congestion control, the congestion control variably defining an allowable number of packets which can be sent in the packet-based communication **(Park discloses multiplicative decrease congestion avoidance, upon loss of a segment, reduces the congestion queue 50 by half from a default size (down to a minimum of at least one segment). For those segments that remain in the allowed queue 50, the re-transmitter 54 is backed off exponentially; Column 4 lines 38-41)** before receipt of acknowledgment messages for the sent packets, wherein said allowable number of packets is reduced in case of packet loss during transmission; **(Park**

discloses each time the mobile end station 20 receives an ACK from the MDIS 30, the transport layer 46 of the mobile end station increments the queue size until the queue size reaches half the maximum limit; Column 4 lines 43-47)

receiving the message indicating a handover of the first network element;

and **(Park discloses the hand-off manager informs the congestion controller 48 that the delay/loss of packets was due to a mobile-specific event (e.g., hand-off); Column 5 lines 67-column 6 line 4)**

change, in response to the message, the congestion control to provide faster recovery rate of said allowable number after handover as compared to the recovery rate of said allowable number after a packet loss not caused by handover conditions, wherein said allowable number was reduced due to the handover. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 19 Park taught the system according to claim 18, as descriebd above. Park further teaches wherein:

the second network element is configured to maintain the congestion control by maintaining a congestion window of variable size, the size of the congestion window defining said allowable number of packets which can be sent before receipt of acknowledgment messages for the sent packets, **(Park discloses multiplicative decrease congestion avoidance, upon loss of a segment, reduces the congestion**

queue 50 by half from a default size (down to a minimum of at least one segment). For those segments that remain in the allowed queue 50, the re-transmitter 54 is backed off exponentially; Column 4 lines 38-41) and the size being controlled dependant on the number of sent packets for which no acknowledgment messages have been received so that the window size is reduced in case of packet loss during transmission: ;(**Column 4 lines 38-41**). and the congestion window size control to provide faster recovery rate of the window size after handover as compared to the recovery rate of the window size after packet loss. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 20, Park taught the system according to claim 18, as described above. Park further teaches wherein said first network element is further configured to: maintain a congestion control, **(Park discloses the transport layer 46 of the mobile end station invokes a congestion control and recovery process when packets are lost for any reason; Column 4 lines 32-34)** the congestion control variably defining an allowable number of packets which can be sent to the second network element in the packet-based communication before receipt of acknowledgment messages for the sent packets, wherein said allowable number of packets is reduced in case of packet loss during transmission; **(Park discloses each time the mobile end station 20 receives an ACK from the MDIS 30, the transport layer 46 of the mobile end station**

increments the queue size until the queue size reaches half the maximum limit; Column 4 lines 43-47) <u>and change, in response to transmission of the message, the congestion control to provide faster recovery rate of said allowable number after handover as compared to the recovery rate of said allowable number after a packet loss not caused by handover conditions, wherein said allowable number was reduced due to the handover.</u> **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 23, Park taught a system according to claim 18, as described above. Park further teaches wherein said second network element <u>is configured to change the congestion control by invoking</u> a fast retransmit and fast recovery algorithm so as to provide said faster recovery rate. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 24, Park taught the system according to claim 20, as described above. Park further teaches wherein said first network element is <u>configured to change the</u>

congestion control by invoking a fast retransmit and fast recovery algorithm so as to provide said faster recovery rate, **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 25, Park taught the system according to claim 18, as described above. Shorey further teaches wherein the second network element is configured to change the congestion control by the increasing the size of a congestion window in a step-wise manner. **Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 30, Park taught the system according to claim 18, as described above. Park further teaches wherein the second network element comprises a correspondent node. **(Park discloses similarly, a mobile end station 20 can roam from the range of a first MDIS 30 to the range of a second MDIS 32; Column 3 lines 31-34)**

Regarding claim 32, Park taught the system according to claim 18, as described above. Park further teaches wherein

the second network element comprises a congestion control means, and wherein the

second network element is configured to change the congestion control by sending a signal to the congestion control means, the signal indicating to the congestion control means that the congestion control is to be changed so as to provide said faster recovery rate. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 35, Park teaches an apparatus comprising at least one processor and at least one memory storing computer program code, wherein the at least one memory and stored computer program code are configured to, with the at least one processor, cause the apparatus to at least:

maintain a congestion control, the congestion control variably defining an allowable number of packets**(Park discloses multiplicative decrease congestion avoidance, upon loss of a segment, reduces the congestion queue 50 by half from a default size (down to a minimum of at least one segment). For those segments that remain in the allowed queue 50, the re-transmitter 54 is backed off exponentially; Column 4 lines 38-41)** which can be sent in a packet-based communication between the apparatus and a network element before receipt of acknowledgment messages for sent packets, wherein said allowable number of packets is reduced in case of packet loss during transmission; **(Park discloses each time the mobile end station 20 receives an ACK from the MDIS 30, the transport layer 46 of the mobile end**

station increments the queue size until the queue size reaches half the maximum limit; Column 4 lines 43-47)

receive a message indicating a handover of the network element; **(Park discloses the hand-off manager informs the congestion controller 48 that the delay/loss of packets was due to a mobile-specific event (e.g., hand-off); Column 5 lines 67- column 6 line 4)**

and change, in response to the message, the congestion control to provide faster recovery rate of said allowable number after handover as compared to the recovery rate of said allowable number after a packet loss not caused by handover conditions, wherein said allowable number was reduced due to the handover. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 36, Park taught the apparatus of claim 35, wherein the at least one memory and stored computer program code are configured to, with the at least one processor, cause the apparatus to:

maintain the congestion control by maintaining a congestion window of variable size, the size of the congestion window defining said allowable number of packets which can be sent before receipt of acknowledgment messages for the sent packets, , **(Park discloses multiplicative decrease congestion avoidance, upon loss of a segment,**

reduces the congestion queue 50 by half from a default size (down to a minimum of at least one segment). For those segments that remain in the allowed queue 50, the re-transmitter 54 is backed off exponentially; Column 4 lines 38-41) and the size being controlled dependant on the number of sent packets for which no acknowledgment messages have been received so that the window size is reduced in case of packet loss during transmission; **(Column 4 lines 38-41).** and change the congestion control by changing the congestion window size control to provide faster recovery rate of the window size after handover as compared to the recovery rate of the window size after packet loss. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)**

Regarding claim 42, Park taught the apparatus of claim 35, as describe above. Park further teaches wherein the apparatus further comprises a congestion control means, wherein the at least one memory and stored computer program code are configured to, with the at least one processor, cause the apparatus to change the congestion control by sending a signal to the congestion control means, the signal indicating to the congestion control means that the congestion control is to be changed so as to provide said faster recovery rate. **(Park discloses the mobile end station 20 in turn sends a notification packet to the fixed end station 40 to inform the fixed end station that**

the congestion control and recovery process is being bypassed and to initiate fast re-transmission; Column 6 lines 6-11)

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 10, 13, 15, & 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park(5912878) in view of Gwon(2003/0016655),

Regarding claim 4, Park taught a method according to claim 1, as described above.

Park does not explicitly disclose these limitations, however Gwon does teach first network element comprises a mobile node which, when moving from one subnet into another foreign subnet, acquires a care-of address, and sends said message to its home network and/or to a correspondent node informing the network or node on the care-of-address. ***(Gwon discloses the mobile node's new "care of" address includes the new local router's IP address and a sub-net address component for the mobile node 135 as advertised by the local router R2; Paragraph 50 lines 6-9)***

It would be obvious to a person of ordinary skill in the art at the time of the invention to modify Park's end station with improved user response time in a mobile network to include Gwon's fast dynamic route establishment in wireless, mobile access digital network using mobility prediction. One of ordinary skill in the art would have been motivated to make this modification in order to have a more efficient method of reducing packet latency. *Gwon discloses More specifically what is needed is a way to reduce packet latency and jitter in third generation, wireless, mobile access IP data networks that is operative within the proposed Mobile IP standards and that reduces packet latency and jitter resulting in real-time from data communication hand-off processes, including dynamic packet rerouting; Paragraph 23.*

Therefore, it would be obvious to combine Park and Gwon to arrive at the limitations in claim 4.

Regarding claim 5, Park taught the method according to claim 1, as describe above. Gwon further teaches wherein said message comprises a "Binding Update" message. ***(Gwon discloses the mobile node 135 registers the new "care of" IP address with its home area router (HA) and optionally with one or more correspondent nodes 140 by sending binding update messages containing both the new "care of" IP address and the mobile node's permanent home IP address; Paragraph 50 lines 9-14)***

Regarding claim 16, Park teaches the method according to claim 15, as described above. Gwon further teaches wherein the signal is implemented by duplicating acknowledgement packets by an [Internet Protocol layer function to a Transmission Control Protocol layer function. ***(Gwon discloses where connectionless IP routing is in use, once the Binding Update Acknowledgement is received, the mobile node 135 switches or hands-off its communication link with the network 100 from the current foreign agent to the next foreign agent; Paragraph 83 lines 1-5.*** **In particular, the mobile node (MN) 135 should preferably use Neighbor Unreachability Detection as described in RFC 2461 to detect TCP acknowledgements of data packets sent to local router RI; Paragraph [48]*)***

Regarding claim 17, Park taught the method according to claim 1, as describe above. Gwon further teaches wherein the communication between the first and second network elements is an comprises a Mobile Internet Protocol version 6-based Mobile IPv6 based communication. ***(Gwon discloses in either instance, the switch or hand-off is accomplished simply by the mobile node 135 de-registering with the previous foreign agent and beginning to use the new foreign agent for communications as described in the Mobile IP version 4 and 6 documents identified and incorporated by reference; Paragraph 83 lines –10)***

Regarding claim 21, Park taught the system according to claim 18, as described above. Gwon further teaches wherein the first network element comprises a mobile node which, when moving from one subnet into another foreign subnet, acquires a care-of address, and sends said message to its home network informing the latter on the care-of-address. ***(Gwon discloses the mobile node's new "care of" address includes the new local router's IP address and a sub-net address component for the mobile node 135 as advertised by the local router R2; Paragraph 50 lines 6-9)***

Regarding claim 22, Park taught the system according to claim 18, as described above. Gwon further teaches wherein said message comprises a "Binding Update" message. ***(Gwon discloses the mobile node 135 registers the new "care of" IP address with its home area router (HA) and optionally with one or more correspondent nodes 140 by sending binding update messages containing both the new "care of" IP address and the mobile node's permanent home IP address; Paragraph 50 lines 9-14)***

Regarding claim 33, Park in view of Shorey taught system according to claim 32, as described above. Gwon wherein the signal is implemented by duplicating acknowledgement packets by an Internet Protocol layer function to a: Transmission Control Protocol layer function. ***(Gwon discloses where connectionless IP routing is in use, once the Binding Update Acknowledgement is received, the mobile node***

135 switches or hands-off its communication link with the network 100 from the current foreign agent to the next foreign agent; Paragraph 83 lines 1-5.* In particular, the mobile node (MN) 135 should preferably use Neighbor Unreachability Detection as described in RFC 2461 to detect TCP acknowledgements of data packets sent to local router RI; Paragraph [48]*)

Regarding cliam 34, Park taught the system according to claim 18, as described above. Gwon further teaches wherein the communication between the first and second network elements <u>comprises a Mobile Internet Protocol version 6-based </u>Mobile IPv6 based communication. ***(Gwon discloses in either instance, the switch or hand-off is accomplished simply by the mobile node 135 de-registering with the previous foreign agent and beginning to use the new foreign agent for communications as described in the Mobile IP version 4 and 6 documents identified and incorporated by reference; Paragraph 83 lines –10)***

Regarding claim 43, Park taught the apparatus of claim 42, as described above. Gwon further teaches wherein the signal is implemented by duplicating acknowledgement packets by an <u>Internet Protocol </u>layer function to <u>a Transmission Control Protocol </u>layer function. ***(Gwon discloses where connectionless IP routing is in use, once the Binding Update Acknowledgement is received, the mobile node 135 switches or hands-off its communication link with the network 100 from the current foreign agent to the next foreign agent; Paragraph 83 lines 1-5.*** **In particular, the mobile**

node (MN) 135 should preferably use Neighbor Unreachability Detection as described in RFC 2461 to detect TCP acknowledgements of data packets sent to local router RI; Paragraph [48])

18. Claims 6-12, 14, 15, 26, 28, 29, 31, 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park(5912878) in view of Shorey (6975591),

Regarding claim 6, Park taught the method according to claim 1, as described above. Park does not explicitly disclose these limitations, however Shorey does teach wherein <u>changing the congestion control comprises invoking</u> a fast retransmit and fast recovery algorithm so as to provide said faster recovery rate. **(Shorey discloses the basic congestion control algorithms of TCP [1], slow start, congestion avoidance, fast retransmit are used in the protocol. k-SACK uses a modified fast recovery algorithm; Column 5 lines 61-63)**

It would be obvious to a person of ordinary skill in the art at the time of the invention to modify Park's end station with improved user response time in a mobile network to include Shorey's method for improving TCP throughput over lossy communication links. One of ordinary skill in the art would have been motivated to make this modification in order to have a system which can improve or regulate TCP throughput whether the communication links are congested or not. *Shorey dislcoses to achieve the said objective this invention relates to a system for improving TCP throughput over lossy communication links without affecting performance over non-lossy links*

comprising: means for determining lookahead-loss which is the number of lost packets in a given loss-window; Column 2 lines 29-33.

Therefore, it would be obvious to combine Park and Shorey to arrive at the limitations in claim 6.

Regarding claim 7, Paker taught the method according to claim 1, as described above. Shorey further teaches wherein said first

network element comprises a fast retransmit and fast recovery algorithm so as to provide a faster recovery rate, and is configured to trigger, when generating said message, the invocation of said fast retransmit and fast recovery algorithm. **(Shorey discloses the basic congestion control algorithms of TCP [1], slow start, congestion avoidance, fast retransmit are used in the protocol. k-SACK uses a modified fast recovery algorithm; Column 5 lines 61-63)**

Regarding claim 8, Paker taught the method according to claim 1, as described above. Shorey further teaches wherein changing

the congestion control comprises the faster recovery rate includes a step of increasing the size of a congestion window in a step-wise manner. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 7-13)***

Regarding claim 9, Park in view of Shorey taught the method according to claim 8, as describe above. Shorey further teaches wherein increasing the size of the congestion window comprises increasing the size of the congestion window in a step-wise manner to a size 20% to 100% of the size of the congestion value before the congestion window was reduced due to the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 10, Park in view of Shorey taught Method according to claim 9, as described above. Shorey further teaches wherein increasing the size of the congestion window in a step-wise manner comprises increasing the size of the congestion window in a step-wise manner to a size increased to at least approximately 50% of the size of the congestion value before the congestion window was reduced due to start of the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 11, Park taught the method according to claim 1, as described above. Shorey further teaches wherein changing the congestion control comprises increasing the size of a congestion window in a step-wise manner to a value lying in a range from more than a minimum window size up to, and including the size of the window before the window was reduced due to handover, and by subsequent ramp-like or exponential increase of the congestion window size. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 12, Park taught the method according to claim 1, as describe above. Shorey further teaches wherein changing the congestion control comprises increasing the size of a congestion window in an exponential manner up to a threshold value and a subsequent ramp-like increasing of the congestion window size, wherein the faster recovery rate is implemented by setting the threshold value to at least one-half of, and up to, the size of the congestion window before the size of the congestion window was reduced due to the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation***

thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)

Regarding claim 14, Park taught the method according to claim 1, as described above. Shorey further teaches wherein changing the congestion control comprises informing congestion control means which in response triggers the invocation of a fast retransmit and fast recovery algorithm. **(Shorey discloses the basic congestion control algorithms of TCP [1], slow start, congestion avoidance, fast retransmit are used in the protocol. k-SACK uses a modified fast recovery algorithm; Column 5 lines 61-63)**

Regarding claim 15, Park taught the method according to claim 1, as describe above. Shorey further teaches wherein changing the congestion control comprises sending a signal to congestion control means, the signal indicating to the congestion control means that the congestion control is to be changed so as to provide said faster recovery rate. **(Shorey discloses the basic congestion control algorithms of TCP [1], slow start, congestion avoidance, fast retransmit are used in the protocol. k-SACK uses a modified fast recovery algorithm; Column 5 lines 61-63)**

Regarding claim 26, Park taught the System according to claim 25, as described above. Shorey further teaches wherein increasing the size of the congestion window comprises

increasing the size of the congestion window in a step-wise manner increased- to a size 20% to 100% of the size of the

congestion value before the congestion window was reduced due to the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 27, Park in view of Shorey taught the system according to claim 26, as described above. Shorey further teaches wherein increasing the size of the congestion window in a step-wise manner comprises increasing the size of the congestion window [[is]] in a step-wise manner to a size increased to at least approximately 50% of the size of the congestion value before the congestion window was reduced due to start of the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 28, Park taught the system according claim 18, as describe above. Shorey further teaches wherein the second network element is configured to change the

congestion control by the increasing the size of a congestion window in a step-wise manner to a value lying in a range from more than a minimum window size up to, and including the size of the window before the window was reduced due to handover, and by subsequent ramp-like or exponential increase of the congestion window size. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 29, Park taught the system according to claim 18, as described above. Shorey further teaches wherein the second network element is configured to change the congestion control increasing the size of a congestion window in an exponential manner up to a threshold value and a subsequent ramp-like increasing of the congestion window size, wherein the faster recovery rate is implemented by setting the threshold value to at least one-half of, and up to, the size of the congestion window before the size of the congestion window was reduced due to the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 31, Park taught the system according to claim 18, as described above. Shorey further teaches wherein at least ~~one of the~~ second network element comprises a congestion control means, and wherein second network element is configured to change the congestion control by informing the informs its congestion control means which in response triggers the invocation of a fast retransmit and fast recovery algorithm. **(Shorey discloses the basic congestion control algorithms of TCP [1], slow start, congestion avoidance, fast retransmit are used in the protocol. k-SACK uses a modified fast recovery algorithm; Column 5 lines 61-63)**

Regarding claim 37, Park taught the apparatus of claim 35, as described above. Shorey further teaches wherein the at least one memory and stored computer program code are configured to, with the at least one processor, cause the apparatus to change the congestion control by invoking a fast retransmit and fast recovery algorithm so as to provide said faster recovery rate, **(Shorey discloses the basic congestion control algorithms of TCP [1], slow start, congestion avoidance, fast retransmit are used in the protocol. k-SACK uses a modified fast recovery algorithm; Column 5 lines 61-63)**

Regarding claim 38, Park taught the network the apparatus of claim 35, as described above. Shorey wherein the at least one memory and stored computer program code

are configured to, with the at least one processor, cause the apparatus to change the congestion control by the faster recovery rate includes a step of increasing the size of a congestion window in a step-wise manner, to a size 20% to 100% of the size of the congestion value before the congestion window was reduced due to the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 39, Park in view of Shorey taught the apparatus of claim 38, as described above. Shorey further teaches wherein increasing the size of the congestion window in a step-wise manner comprises increasing the size of the congestion window in a step-wise manner to a size increased to at least approximately 50% of the size of the congestion value before the congestion window was reduced due to the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 40, Park taught the apparatus of claim 35, as described above.

Shorey further teaches wherein the at least one memory and stored computer program code are configured to, with the at least one processor, cause the apparatus to change the congestion control by increasing the size of a congestion window in an exponential manner up to a threshold value and a subsequent ramp-like increasing of the congestion window size, wherein the faster recovery rate is implemented by setting the threshold value to at least one-half of, and up to, a size of the congestion window before the congestion window was reduced due to the handover. ***(Shorey discloses more accurate estimation of pipe size using the received selective acknowledgement (SACK) data, use of said accurate pipe size information for controlling window inflation and deflation thereby allowing quicker retransmission of lost packets and resulting faster recovery; Column 3 lines 55-60)***

Regarding claim 41, Park in view of Shorey taught the apparatus of claim 35, as described above. Shorey further teaches wherein the apparatus further network element comprises a congestion control means, and wherein the at least one memory and stored computer program code are configured to, with the at least one processor, cause the apparatus to change the congestion control by informing the congestion control means which in response triggers invocation of a fast retransmit and fast recovery algorithm. **(Shorey discloses the basic congestion control algorithms of TCP [1], slow start, congestion avoidance, fast retransmit are used in the protocol. k-SACK uses a modified fast recovery algorithm; Column 5 lines 61-63)**

Response to Arguments

19. Applicant's arguments with respect to claims 1-43 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gerald Smarth whose telephone number is (571)270-1923. The examiner can normally be reached on Monday-Friday(7:30am-5:00pm)est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeff Pwu can be reached on (571)272-6798. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GERALD SMARTH/

Examiner, Art Unit 2446

/Benjamin R Bruckart/

Primary Examiner, Art Unit 2446